DOCUMENT RESUME

ED 436 368 SE 062 019

AUTHOR	Hicks, Debby Carter
TITLE	A Classroom Improvement Plan: Designed To Improve Middle School Student's Science Scores through Hands-on Activities and Portfolio Assessment.
PUB DATE	1998-00-00
NOTE	58p.; Ed.D. Practicum, Nova Southeastern University.
PUB TYPE	Dissertations/Theses - Practicum Papers (043)
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	Educational Assessment; *Hands on Science; *Instructional Effectiveness; Instructional Innovation; Middle School Students; Middle Schools; Multiple Intelligences; *Portfolio Assessment; *Science Achievement; Science Instruction; Teaching Methods

ABSTRACT

This practicum reports on a project designed to improve middle school students' science scores. The project used three general strategies to improve science learning: (1) the inclusion of multiple hands-on activities and techniques in the science classroom; (2) the implementation of portfolio assessment; and (3) the inclusion of a Multiple Intelligences approach to teaching. The study reports that 164 of 180 students met the school district requirements for successful completion of middle school science. (Contains 37 references.) (WRM)

Reproductions supplied by EDRS are the best that can be made
from the original document.

A Classroom Improvement Plan: Designed to Improve Middle School Student's Science Scores Through Hands-on Activities and Portfolio Assessment

ED 436 368

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

D. Hicks

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

by

Debby Carter Hicks

Cluster 67

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

A Practicum II Report Presented to
the Ed.D. Program in Child and Youth Studies
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

NOVA Southeastern University

1998

BEST COPY AVAILABLE

SE060035

Practicum Approval

This practicum took place as described.

Margaret L Click Ph.D.

Verifier: Margaret Click, Ph.D.

Guidance Counselor

Title

Howey-in-the-Hills, Florida

Address

May 28, 1998

Date

This practicum report was submitted by Debra Carter Eicks under the direction of the adviser listed below. It was submitted to the Ed. D. Program in Child and Youth Studies and approved in partial fulfillment of the requirements for the degree of Doctor of Education at NOVA Southeastern University.

Approved:

10 September 1998 Alden J Nickelson

Date of Final Approval of Report Dr.A.Nickelson,Ph.D.,Adviser

Acknowledgements

I would like to thank my wonderful husband Lee for all of his support not only during the writing of this practicum but for his constant support over the past three years. He has always encouraged me to keep going even when I felt like I couldn't go on. I love you.

I would also like to thank my friend and colleague for once again helping me with all of the many revisions on this paper. It would have been much more difficult to complete this paper had it not been for her constant help, even when she didn't think she could read another word for fear of going blind! Thanks!

Abstract

A Classroom Improvement Plan Designed to Improve Middle School Students Science Scores Through Hands-on Activities and Portfolio Assessment. Hicks, Debra Carter, 1998: Practicum Report, NOVA Southeastern University, Ed.D. Program in Child and Youth Studies. Science Teachers/Grade Level Teaching Teams/Inservice Training/Supervision.

This practicum was designed to improve middle school students science scores. The writer found that an increasing number of students were failing to meet the requirements set by the school district for successfully passing an academic class. The following outcome was projected for this practicum: there will be an increase in the number of students passing middle school science (160 students out of a projected 180 students attending the school will pass science).

The writer chose to implement the following practices to help the students achieve success: (1) the inclusion of multiple hands-on activities and/or techniques in the science classroom; (2) the implementation of portfolio assessment; and (3) the inclusion of a Multiple Intelligences approach to teaching.

Analysis of the data revealed that the use of the above mentioned strategies resulted in an increase in the number of students passing middle school science. Of the 180 students taking science, 164 met the school districts requirements for successful completion.

****

Permission Statement

As a student in the Ed.D. Program in Child and Youth Studies, I do (X) do not ( ) give permission to NOVA Southeastern University to distribute copies of this practicum report on request from interested individuals. It is my understanding that NOVA Southeastern University will not charge for dissemination, except to cover the cost of microfiching, handling, and mailing of the materials.

July 21, 1998
(date)

Debby Carter Hicks
(signature)

Table of Contents

Acknowledgements.....iii
Abstract.....iv
Chapter I: Introduction.....1
Description of Community.....1
Writer's Work Setting.....1
Writer's Role.....4
Chapter II: Study of the Problem.....5
Problem Statement.....5
Problem Description.....5
Problem Documentation.....5
Causative Analysis.....6
Relationship of the Problem to the Literature.....10
Chapter III: Anticipated Outcome and Evaluation Instrument.17
Goals and Expectations.....17
Expected Outcomes.....17
Measurement of Outcomes.....17
Chapter IV: Solution Strategy.....19
Statement of Problem.....19
Discussion and Evaluation of Solutions.....19
Description of Selected Solutions.....26
Report of Action Taken.....27
Chapter V: Results.....35
Results.....35
Discussion.....37
Recommendations.....40
Dissemination.....41
References.....42

Appendices

A Grade Report.....46

B Report Card.....48

C Student Survey.....50

Chapter I: Introduction

Description of Community

The community is located in the deep south. It is bordered by a pristine national forest and luscious orange groves. This rural southern community hosts approximately 300 people and is centrally located in the state. The community is socio-economically composed of a heterogeneous mixture of upper lower class to middle class citizens. The average age of the citizenry of the community is approximately ten years older than that of the state. This puts the average age of the citizens somewhere around 48 years old.

The ethnicity of the community is primarily white Anglo-Saxton Protestants. There are no Asian, African-American, or Latin American families in the community as might be expected. However, there are a few Canadian, British, and French retired citizens living in the community's retirement village.

Writer's Work Setting

The school is picturesque from the near century old administration building with Spanish Mission architecture to the ancient live oak trees hung with Spanish moss. The school occupies approximately 25 acres of land and has an operating greenhouse, barn with pasture area, and rabbit hutches. There are 11 portable classrooms situated around the campus.

The school setting comes alive each day with sixth, seventh, eighth, and ninth graders. The student population is

approximately 180. The demographic distribution of the student population is 155 Caucasian and 25 African-American students. The students have been targeted for Drop Out Prevention and are bussed from across the northern part of the county. They are an economically diverse group. However, they are culturally very much alike with their rural southern heritage.

The principal, guidance counselor, dean, 12 teachers, data entry clerk, bookkeeper, 2 food service personnel, and 2 custodial engineers that greet the students each day are very special people. This combined staff forms a very close family that share a dedication and love for each student and their future well-being. Their vision is to provide a positive educational environment that fosters successful learning for all students. Their mission is met through increased parental and community involvement and an environment that includes an integrated curriculum which emphasizes improving attendance, academics, and life preparatory skills. The staff strives to develop and maintain an environment that minimizes conditions which interfere with learning and maximizes opportunities for students to become functioning, productive members of society.

Being enrolled at a Drop Out Prevention middle school does not exempt the students from meeting the academic standards outlined by the county and state. The students are expected to meet Language Arts, science, math, social studies, and vocational standards. The vocational classes include Food Services, Horticulture, Business, Building

Technology, and Agriscience.

The school is similar to other middle schools in the academics required of the students and the normal discipline problems that exist. The economic diversity also compares with that seen in other middle schools throughout this rural county.

In contrast to other middle schools, this Drop Out Prevention middle school offers a variety of vocational classes and has a small student population which allows for more one-on-one work between teachers and students. The school has a homogeneous mixture of cultures and social classes in contrast to larger schools within the county that have a more heterogeneous mixture.

The school day is unique in that it is divided into two 2 hour blocks with physical education and/or personal choice classes separating the academic/vocational blocks. Other middle schools in the area follow 55 minute class schedules.

The eligibility criteria for admission to the school are different from other middle schools. Eligibility is based on excessive absences, grade retention, a GPA below a 1.5 or 2 or more D's in the previous semester, performance below potential as evidenced by standardized test scores, or personal/family problems that interfere with learning. These criteria must be documented by Student Services and/or the student must have been previously served by an Alternative Education program when staffed into this Drop Out Prevention program.

This school has many unique features such as aesthetic

beauty, close family-like staff, small student population, homogeneous culture, vocational classes, 2 hour class blocks, and eligibility criteria for admission. These unique features enhance the school by building on the characteristics common with other middle schools in the area.

Writer's Role

The writer teaches sixth, seventh, eighth, and ninth grade science classes and is the science resource teacher for the school as well as Science Department Chairperson. The writer has a master's degree in science and social studies with a strong background in math. The writer has 11 years teaching experience, 8 years experience working with dropouts, and 6 years experience working with middle school Drop Out Prevention. The writer is also an Adjunct Professor of Biological Sciences at the community college level with 6 years experience. The writer is currently working on a doctorate in Curriculum Development and Systemic Change through NOVA Southeastern University in Fort Lauderdale, Florida.

Chapter II: Study of the Problem

Problem Statement

The problem to be solved in this practicum was an unacceptably high number of middle school students at the writer's school who had failed to pass science. The principal, guidance counselor, and writer were concerned about the number of students that had not passed middle school science classes at this Drop Out Prevention middle school.

Problem Description

The school district, in accordance with state mandates, has established a minimal grade requirement in order to successfully pass a class. This requirement is that a student must achieve an over all average of 70 or better. This average must be achieved from no less than nine grades per grading period. At the writer's school, an unacceptably high number of students had failed to meet this minimal requirement in science classes.

Problem Documentation

The writer, through careful examination of the teachers' grade books and/or computer grade programs and conferences with the school principal and guidance counselor, concluded that the number of students failing science was increasing. During the 1995-96 school year, there were 155 students enrolled at the school and of these students, 55 did not pass

science. This was approximately 35 percent of the student population. During the 1996-97 school year, there were 168 students enrolled and 75 of these did not pass science. This represents approximately 45 percent of the student population. The data reflects a 10 percent increase in the number of students not passing science in just one year. The principal, guidance counselor, and writer agreed that there must be something done to turn this trend around.

Causative Analysis

Two methods of assessing the causes of the problem were used. First, the writer, as Science Department Chairperson, held a department meeting with the classroom teachers to discuss the increasingly high number of students not passing science courses. The writer served as facilitator for the meeting. The writer simply posed questions and recorded all responses on a large flip chart. The questions asked were: "Why do you believe the students are not interested in science?"; and "What do you as a classroom teacher see as the problem as to why the students are not passing science?". After all responses were recorded, the teachers were asked to look for similarities among the responses and group them accordingly. Next, the teachers were asked to restate their responses based on the groupings that were made. The teachers developed the following instructional causes as to why the number of students not passing science was increasing: (a) the teachers are not properly prepared to teach science classes; (b) the teachers had never taught science before;

and (c) the teachers did not want to teach science. With the completion of this list, the department meeting was dismissed.

The second method of assessing the causes of the problem in the school was to interview the science teachers individually. The writer followed the below listed criteria when conducting personal interviews with the teachers. Only people having taught science to students at-risk and people using a variety of hands-on techniques in the secondary science classroom were interviewed. The writer, then using the criteria given, interviewed grade level teachers for sixth, seventh, eighth, and ninth as well as the speciality class instructors for Agriscience, Marine Science, Horticulture, and Environmental Science. All teachers interviewed worked at the writer's school.

The writer interviewed B. Johnson, a sixth grade general science teacher with two years teaching experience with students at-risk. In the interview B. Johnson (personal communication, March 12, 1997) stated that he believed he was insufficiently prepared with respect to the classroom supplies necessary to make class interesting and/or fun for the students. B. Johnson stated that due to the lack of classroom supplies, he was unable to demonstrate or allow the students to carry out many of the hands-on activities suggested in the text book and/or other classroom investigations that he believed would have enhanced his classroom instruction and helped to motivate the students.

L.D. Dufresne, a seventh grade life science teacher, was

interviewed. The writer's students suggested Mrs. Dufresne because of her use of hands-on classroom activities and the students stated (personal communication, March 10, 1997) that her class was fun. Mrs. Dufresne has four years teaching experience working with students at-risk. Mrs. Dufresne (personal communication, March 12, 1997) stated that she did not have the necessary background to teach science. She stated that she was a Language Arts major and did not believe herself to be qualified to teach science. However, since being assigned to teach the class, she had read many articles and books on how to make science class interesting and fun. Mrs. Dufresne also stated that she believed that someone with more educational experience in the sciences would be better at teaching such classes.

The eighth grade teacher chosen was L. Merklinger. Mrs. Merklinger (personal communication, March 12, 1997) has 15 years experience teaching students at-risk and has taught out of field most of those years. Her experience includes teaching such classes as Language Arts, math, science, social studies, Environmental Science, clothing construction, and drama. Mrs. Merklinger stated that she believed that a multiple intelligence approach to teaching students at-risk would be most helpful in reaching the students academically. But she does not routinely use such an approach nor has she been trained to implement a multiple intelligence approach. However, she does see the need for such training and stated that she would be willing to attend such a workshop, if offered.

The Agriscience and Horticulture teacher interviewed was T. Rogers. Mrs. Rogers (personal communication, March 12, 1997) stated that her degree is in Elementary Education but she grew up on a local working farm and saw that as being her only qualification for teaching Agriscience and/or Horticulture classes when given the assignment. She stated that she truly was not prepared academically to meet the challenges of the classes three years ago when she started. However, since that time she has gone back to school herself and will have her teaching certificate endorsement in agriculture in the fall of 1997. Rogers also sees the lack of necessary classroom supplies and academic training as major drawbacks to anyone teaching science or any other class.

The Environmental and Marine Science teacher interviewed was D.V. Cater. Ms. Carter was the only teacher interviewed with a degree in science. Ms. Carter (personal communication, March 12, 1997) stated that her degree was in Secondary Science Education and that she had 10 years teaching experience working with students at-risk. Ms. Carter fully understands the frustration the other teachers have with the lack of classroom supplies and background knowledge. She stated that without these two crucial items that making any class enjoyable and interesting for students would be hard. But when working with unmotivated and academically challenged students at-risk, it is doubly hard and frustrating for the classroom teacher. Ms. Carter also stated that the use of Gardner's Multiple Intelligences approach to teaching is essential when working in Drop Out Prevention or in any

academic setting.

After studying and analyzing the personal interviews, the writer concluded that there were three commonalties among the teacher's responses. First, that not having a science education background limited the teachers tremendously; second, that a lack of classroom supplies hindered the inclusion of hands-on activities; and last, that the inclusion of a multiple intelligence approach to teaching would greatly benefit the students.

Relationship of the Problem to the Literature

The writer used the Educational Resources Information Center (ERIC) and the writer's school district policy books to conduct the actual literature search. The writer found it necessary when searching the literature to narrow the scope of interest. The writer used specific limiting criteria when conducting the review of the literature. The criteria used were as follows: (a) only materials less than 10 years old were selected; and (b) only materials specifically related to teaching students at-risk were selected. The studies cited were then organized as follows: (a) those dealing with the lack of student success; and (b) those dealing with the contributing factors to the lack of success.

Many professionals have reported that a problem exists concerning middle school students lack of success in the science classroom. Prescott, Rinard, Cockerill, and Baker (1996) found that an increasing number of students were not passing the current science curriculum. Based on their

investigations and analysis, it was concluded that by presenting real-world applications before abstract concepts, the middle 50 percent of secondary students could make sense of the science curriculum. They found that this approach gives students a better idea of why they are learning the material, and as a result, students become more engaged in their learning and produce higher quality work.

Miller (1996) and Accongio and Doran (1993) found that the number of middle school students passing the current science curriculum was declining. Science educators and others are faced with determining what changes must be made in education to insure scientific literacy for all students. They propose that cross-disciplinary lessons based on everyday life situations are a more efficient way to teach the standards and results in greater retention and understanding of the material presented.

The Connecticut State Department of Education (1991) found that a growing number of middle school students were not mastering the basic science skills. The state supported science reform and desired the development of a curriculum that included core values, focused on appropriate learning skills, and integrated the emerging technologies to the advantage of students. The state of Connecticut views schools as a serious business for the early adolescent who must cope simultaneously with a changing self and a changing world. Both need attention or neither will be sufficiently served. Developing healthy, confident students and equipping them with the intellectual skills necessary to succeed in a fast-

paced, information society is the state's ultimate goal.

Craig and Yore (1992) found that how science understandings are communicated and how students construct meaning of these communications are not functioning properly together in many middle schools across the nation. The results were that an ever growing number of middle school students are not acquiring the skills necessary to effectively pass middle school science.

Johnson (1991) concluded that schools must teach students how to organize for action, both as individuals and as members of a group. This includes the development of planning, group process, management, evaluation, and self-evaluation and correction skills for without these skills in place, the middle school students will have tremendous problems succeeding in life.

Nelson and Frederick (1994) found that student failure in middle school science can be contributed to a lack of ownership, curiosity, prior knowledge, and/or the ability of the student to relate the subject matter to his or her daily life and/or other courses in school. Heckman, Confer, and Hakim (1994) found that when students build on prior knowledge and natural curiosity, understanding and confidence blossom. Children often have theories very different from what the teacher thinks they have, therefore it is essential that teachers discuss with the students what they are thinking, what these theories are, and build on this prior knowledge to foster ownership and learning retention. Johnson (1991), Bluhm (1995), and Prescott, Rinard, Cockerill, and

Baker (1996) all concurred that the material being taught must be pertinent to the student's daily lives before the student will buy ownership into it and thus be motivated to succeed.

In summary, the writer found that a problem did exist in the effective teaching of middle school science. It has been found that science concepts are not being effectively communicated to the students. Real-world applications are not being presented before abstract concepts. A cross-disciplinary approach to lessons based on everyday life situations that teach core values, appropriate learning and organizational skills, and integrates technology to the students advantage is not being utilized in the science classroom. Educators are not building on prior knowledge, establishing ownership, and arousing curiosity within the students to improve their lives and their communities through science education. It can be concluded that middle school science education is in trouble. Educators are not stimulating students to learn and as a result, many middle school students are not passing science.

The writer has found many causes to the problems educators are faced with in the science classroom. The literature suggested that the limited variation in methods of presentation and measures of assessment are also contributing factors to student failure in the middle school science classroom. Perrone (1994) found that teachers did not always draw students into the depth and complexity of science because either a problem existed in the educators' ability

and/or the topics were not related to the students' daily lives, therefore many found the topics uninteresting. Perrone also found that what typically passes for student evaluation is a model of assessment that is built around a host of standardized tests that do not get particularly close to student learning and do not provide the teacher with much information of consequence. In many settings, it is a wasteful effort that guarantees too many students a limited education. Assessment is a process for gathering information to meet a variety of evaluation needs. As a process, assessment is built around multiple indicators and sources of evidence, and in this sense, is distinguished from testing. Without a variety of assessment measures in the science classroom, educators are doing students a disservice and an injustice in their critique of the students' classroom learning. Finson (1994), Welch (1995), and Jones (1996) all concur with the findings of Perrone (1991 and 1994). Herman, Aschbacher, and Winters (1992) found that the dissatisfaction with existing standardized testing has given rise to proposals for new assessment alternatives that will better capture significant educational outcomes in the classroom.

Helgson (1992) found that students lack the necessary problem solving strategies and skills required to be successful in the science classroom. Helgson also found that these strategies and skills could be significantly amplified through the use of alternative assessment in the classroom. Students did not perform as well on the old paper and pencil, multiple choice type test as they did when allowed to use

manipulative, hands-on exercises and engage in acquiring constructive knowledge. These same concepts were suggested by Sivertsen (1993) and Woods (1994).

Criscuola (1994) found that a low reading ability severely affected a student's assessment measures. It stands to reason if a student can not read and comprehend the assessment, his or her response to the assessment will most likely be incorrect. Fielding and Pearson (1994) also found that to set the stage for a student to succeed, he or she must be competent to read and comprehend at the level being assessed. Comprehension was once thought to be a natural result of decoding plus oral language. Comprehension is now thought to be a much more complex process involving knowledge, experience, thinking, and teaching. Comprehension inherently involves inferential and evaluative thinking, not just literal reproduction of the author's words. Wilson (1995) found that without some degree of comprehension, reading skills alone were not enough for students to effectively master the science curriculum. This lack in the students' education would negatively effect assessment measured in the science classroom. Wilson advocated student-centered discussions that honor multiple interpretations which would allow for a greater degree of success in the science classroom. The answers to questions in science are not always black or white but most often are found to exist in shades of gray.

In conclusion, the literature suggested that students are not being made to feel empowered in the classroom, nor

are they given ownership in their educational processes. The literature further suggested that an additional cause may be that the science curriculum is not specifically endemic to the environment in which it is being taught. Also, the literature suggested that there is a lack of alternative assessment and creative classroom activities being used in the science classroom. The writer agreed with the literature that these are reasons for students not passing middle school science and that the above mentioned concerns must be addressed if students are to become scientifically literate and positive influences in society.

Chapter III: Anticipated Outcomes and Evaluation Instruments

Goal and Expectation

The unacceptable number of students that were not passing middle school science was the writer's concern. The writer's goal was to increase the number of students passing middle school science within her school.

Expected Outcomes

The following outcome was projected for this practicum: there will be an increase in the number of students passing middle school science (160 students out of a projected 180 students attending the school will pass science).

Measurement of Outcome

To measure the improvement for the outcome, the writer chose to review the teachers' grade books. The decision to review the grade books was based on the availability of the grade books and the fact that they reflected how each student preformed on any given assignment throughout the school year. They also reflected what each evaluated assignment was and what percent of the students' grade each represented (see Appendix A).

The writer chose to use the students report cards to identify the actual number of students per grade level and to verify the number of students passing science at the end of the school year (see Appendix B). The writer expected to see at least 80 percent of the students per grade level averaging

a mean score of 70 or better in science. The local school district mandates that a student must show mastery of any subject such as Language Arts, science, math, or social studies in order to be considered successful and pass the subject. The school district further stipulates that mastery of any subject shall be computated through deriving a mean score of 70 percent or better. They also stipulate that this score be achieved through the averaging of a minimum of one grade per number of weeks per grading period (Lake County Teacher's Handbook, 1997).

Chapter IV: Solution Strategy

Statement of Problem

The problem to be solved in this practicum was the unacceptably high number of middle school students at the writer's school who were failing to pass science. The principal, guidance counselor, and writer were concerned about the number of students that did not pass middle school science classes at this Drop Out Prevention middle school.

Discussion and Evaluation of Solutions

The writer used the Educational Resources Information Center (ERIC) and the writer's school district policy books to conduct the actual literature search. The writer found it necessary when searching the literature to narrow the scope of interest. The writer used specific limiting criteria when conducting the review of the literature. The criteria used were as follows: (a) only materials less than 10 years old were selected; and (b) only materials specifically related to teaching students at-risk were selected. The writer's review of the literature began with solutions based on the use of more hands-on activities, classroom investigations, and the promotion of a sense of stewardship in the students. Secondly, solutions were based on the concepts of teaching for understanding and posing challenges, being able to categorize information, and the promotion of self-evaluation. The final section was based on establishing the importance of teaching community and personal relevance of the material and

the world around them. Project Wild is an interdisciplinary program that emphasizes wildlife education through conservation and environmental education lessons and hands-on projects. It has proven to be effective in educating students on how to make decisions affecting people, wildlife, and the planet. The National Center for Improving Science Education (1992) also stressed the need for a more hands-on approach to science in the middle school years. It was found that through the incorporation of more hands-on activities, students are more actively engaged and motivated in the learning process, thereby academic retention increases.

Florida State University and EcoVentures worked in cooperation to produce EcoVentures: Learning in Florida's Environment (1995) which is a middle school program specifically designed for the state of Florida. The program was designed to help students relate science to their daily lives and surroundings. It stresses the many different environments found within the state and the flora and fauna within each. EcoVentures: Learning in Florida's Environment is an interdisciplinary, hands-on approach to teaching using computer and laser disk technology as well as field exercises and classroom experiments. It has been used throughout the state with proven success in both public and private schools. It allows the students to experience their natural, everyday surroundings in a variety of ways as well as exposing them to other habitats within the state. The use of modern technology in the classroom serves to enhance and reinforce the academic lessons and promote stewardship in the students.

Based on the second set of solutions, the writer has found that among the many agendas of education, understanding must rank close to the top of the list. It has been suggested that students need to spend the larger part of class time engaged in activities that require them to generalize, find new examples, carry out applications, and work through other understanding performances. Perkins and Blythe (1994) stated that understanding is the ability to carry out a variety of performances that show one's understanding of a topic and, at the same time, advance their understanding.

Ellsworth and Sindt (1994) found that learning can be advanced when teachers challenge students to find alternative solutions for problems that he or she has already solved. Ensuring that students engage in reconstruction or anticipation experiences in the science classroom builds on previous knowledge and experiences. Opportunities for the student to become aware of temporal and physical relations among objects, events, and people challenges the student to connect his or her daily life to what is being taught.

Bluhm (1995) and Looman-DeWijk (1996) found that in order for students to succeed in life and academia, schools must equip them with skills for continued learning, including those associated with the following: the collection of information (reading, listening, research); the organization, manipulation, and expression of ideas (mathematics,writing, speaking); the evaluation of information and ideas, including their competent analysis and critique; and the production of new plans and proposals for action.

In order to teach students how to organize for action, both as individual and as members of a group, DeFina (1992) suggested that the development of planning, group process, management, evaluation, and self-evaluation and correction skills can be taught through the use and implementation of portfolio assessment. Portfolios are systematic, purposeful, and meaningful collections of students' works. They can be used for individual subjects or more than one subject. DeFina found that portfolio assessment is multifaceted. It allows students to learn how to select pieces to be placed in the portfolios as well as how to establish criteria for their selection. Portfolios reflect the actual day to day learning activities of students. Portfolios are ongoing thereby showing the students' efforts, progress, and achievements over a period of time. They allow for input by teachers, parents, peers, and school administrators. Hibbard (1995) found that the diversity of portfolio assessment allows for a variety of media and multidimensional works to be displayed and used in the assessment of the learning process that has or is taking place in the student's academic life. It also provides an excellent means by which program effectiveness can be determined.

Yancey (1992) found that portfolios are a way to determine what teachers and students learn from the classroom and generating ways in which to make the learning more personal to the teachers and students. Yancey found that through portfolios, classroom-based assessment can be dedicated to directly enhancing learning with the assessment

of outcomes for purposes of accountability occurring only as a by-product.

Based on the final set of solutions, Rappoport and Kletzien (1996) have found that by providing academic support for community service activities through tying the activities to curriculum goals and outcome assessment, the learners understand the implications of the projects they are engaged in much better and as a result, view the activities in a more positive manner. Rappoport and Kletzien suggested allowing the students to select a public policy issue that affects them locally such as cleaning up litter in a community park. This issue then serves as a starting point for the study, analysis, planning strategies, and possible actions to be taken in the classroom setting. This approach will allow for multiple information sources, multiple solutions, and multiple paths to academic and community awareness growth. Through posing questions and hypothesizing, students learn important life skills. Students are more likely to engage in learning when they see the role that it plays in real life. By seeing the real life role, students can solidify the classroom discussions, research, and analysis into true academic gains. Unger (1994) supported this method of teaching science and achieved success when the students were able to relate the topics being studied to everyday life. Wiske (1994) found that when relating academic topics to everyday life, the teachers must also be a learner and allow the students to see himself or herself in this role and openly negotiate knowledge with the students and encourage

higher order thinking skills.

Miller (1996) found that schools must relate the curriculum content to the immediate concerns of the young adolescents and assure its utility outside the classroom. The young adolescent is interested in virtually everything, but nothing very much, therefore, he or she must be provided with a bombardment of topics that are directly related to the students' daily lives in order to assure a continuity specifically between the science classroom and the students' daily lives. Miller found that this will foster student motivation and learning. Gardner and Boix-Mansilla (1994) and Koba (1996) found that by creating an integrated science curriculum, students' interest in an aptitude for the sciences has increased. The theme of such an integrated curriculum should reflect the belief that all learning in the classroom should empower students to improve their lives or their communities, thus building on the past to improve the future.

The literature suggested that the commitment to excellence in education begins with an understanding of the mission and a dedication to assuring that the school achieves its fullest potential. Some aspects of excellence cost money; others require only the reordering of priorities and a change in focus. Educators can not even begin to know what information students will need to successfully negotiate in the future. Because students cannot be taught all they will need to know, they must be taught how to learn and how to adjust their lives to change that will surround them. TO do

this, students must be provided with high quality intellectual climates that foster the development of adaptive skills that can be used throughout life.

In summary, the literature suggested that educators should promote and allow students to become more actively engaged in learning through the inclusion of hands-on activities and investigative research. The literature also suggested that educators promote the development of organizational and life skills as well as the concepts of self-evaluation and betterment within students. The literature further suggested that educators teach for understanding by drawing on the students' past, personal, and community experiences, thereby developing a sense of ownership and pride within the student.

Description of Selected Solutions

The writer implemented a variety of solutions to the problem. The first potential solution that was implemented was to conduct teacher inservice workshops that were designed to better prepare the science classroom teacher in the use of hands-on techniques and activities as well as relate these to living in Florida. The writer conducted Project Wild and EcoVentures: Learning in Florid's Environment workshops. Through these workshops, the writer inundated and personally demonstrated to the classroom teachers a variety of hands-on techniques and classroom activities that he or she could then implement in their classroom.

The writer also conducted a workshop to increase teacher

awareness and understanding of portfolio assessment, as well as assist teachers in establishing criteria for grading and placing work in the portfolios.

The writer also provided the teachers with the necessary materials to register with the Effective Teaching Center for Multiple Intelligence classes taught there. The writer also wrote personal letters of recommendation to the Effective Teaching Center for those teachers wishing to attend the Multiple Intelligence classes. These classes are designed to better prepare the classroom teacher to meet the needs of each student by presenting classroom material in a variety of ways to ensure that each student's intelligence area is stimulated in an attempt to broaden the students understanding of science.

Through the above mentioned strategies, the writer expected to meet the outcome: there will be an increase in the number of students passing middle school science (160 students cut of a projected 180 students attending the school will pass science).

Report of Action Taken

The writer implemented the practicum at her work setting which consists of approximately 180 Alternative Education middle school students. The writer and three other science teachers used the strategies presented in this report. Implementation began in October 1997.

The writer began implementation by conducting an orientation meeting for the participating teachers. In this

initial meeting, the writer described in detail the objective of the practicum and the outcome that was to be achieved. The writer then described the various solutions that were to be implemented. The teachers were given tentative dates for the Project Wild, EcoVentures: Learning in Florida's Environment, and portfolio assessment workshops pending the arrival of the necessary materials from the district. The only questions that arose were in reference to the dates and times for the workshops. These questions were addressed and the meeting concluded with everyone excited and energized for the new school year.

During the next couple of weeks, the writer assembled the necessary materials to conduct a Project Wild workshop. The 8 hour workshop was to be conducted on a Saturday. The school district suggested that each participating teacher be given Master Inservice Plan points (MIP's) for attending the workshop. Each teacher in the state must show proof of 300 hours every five years of MIP points or the equivalent for teacher recertification. These points are given by the school district for various workshops and training secessions or can be acquired in other ways (Lake County Teacher's Handbook). This added incentive by the school district served as a bonus for the participating teachers.

The workshop began with the teachers taking a pretest designed by Project Wild. The pretest is designed to give the teachers a glimpse into what Project Wild is and who the founders were. Following the pretest, the teachers were introduced to the Activity Guides and a total of eight

activities from the two books were done by the teachers. The day ended with the teachers taking a post-test designed by Project Wild. The post-test is actually the same as the pretest which serves to strengthen the idea and concepts presented. Each teacher received a Project Wild K-12 Activity Guide and The Schoolyard Wildlife Activity Guide at the conclusion of the workshop.

During the following weeks, the writer inserviced the teachers on the use of portfolio assessment. The school district gave the writer copies of A.A. DeFina's book, Portfolio Assessment: Getting Started to give to each teacher. In this book, the use of portfolios as an alternative assessment method is detailed. The book also reviews how to create and use rubrics with portfolios. The book was intended to serve the teachers as a reference during the practicum as well as in the future.

Through the Continuing Education Department of Florida State University, the writer arranged for someone to conduct an EcoVentures: Learning in Florida's Environment workshop at the school. This workshop was also open to anyone else in the area that was interested. Florida State University took care of all publicity, materials, and in getting the teachers credit through MIP points with the school districts involved. There were ten teachers who attended the 6 hour workshop. Four were from the writer's school and the remaining six were from other schools both in and out of the school district. Each teacher received hands-on experience with the program as well as over $1800 worth of materials free from Florida State

University. The three science teachers that were working with the writer all attended the workshop as well as a social studies teacher from the writer's school. This teacher stated that she had heard good things about the program and hoped that after attending the workshop, she would be able to incorporate the program into her eighth grade Florida History classes.

In the following weeks, the writer worked with the teachers individually on the design and use of rubrics with portfolios. Any problems that the teachers were having were discussed privately with the teacher and then openly at the science department meetings if the teacher was willing to share his or her experiences and/or problems with others.

The writer also visited classes and assisted teachers during hands-on activities in the classroom setting. The classroom visitations were prearranged with the teacher before the writer arrived in the classroom. Assistance with hands-on activities was only given at the individual teacher's request. The teachers stated that sometimes an extra pair of eyes and hands would be welcome during hands-on activities when the writer was available. The writer served as an assistant helping the students manipulative the materials and/or follow the steps involved during these visits. The writer did not teach or take over the classroom setting. She merely assisted or facilitated the classroom teacher.

Prior to the Effective Teaching Center announcing the registration for Multiple Intelligence classes, the writer

gave a description of the program and explained the benefits the program offered. The writer also discussed her own personal experiences in the program and the results she had seen after implementing the practices presented. The writer provided registration materials for the teachers working with her. The writer also wrote letters of recommendation for the teachers. All three teachers were accepted into the program. The program required that the teachers attend and participate in six 6 1/2 hour workshops. These were held once each month during the school year. The school district provided pay for substitute teachers since the workshops were held during the normal school day. Throughout the program, the writer was in contact with the teachers. The writer and teachers discussed the research being presented during science department meetings in order that more teachers could benefit from the program indirectly.

The writer and teachers discussed grades received by their students during the first nine weeks grading period. The first nine weeks grading period was prior to the classroom implementation part of this practicum. Practicum implementation began during the sixth week of the first nine weeks grading period with actual classroom implementation beginning in the second nine weeks. The practicum process continued through post-planning following the close of the school year for students. The first nine weeks grades were used because during this time portfolios and Multiple Intelligence concepts were not used. Also, the use of laboratory and/or hands-on activities and their application

to real life situations and settings and were minimal during this period. During subsequent meetings at the close of each grading period, student progress was discussed with respect to the practicum implementation.

The writer and teachers discussed the students that they believed could benefit from science tutoring. The writer then arranged for the students to participate in the tutoring program provided by the school and assisted with the scheduling. The tutoring schedule and individual student progress was monitored by the writer and teachers. Students were dismissed from the program as the school year progressed based on the classroom teacher's recommendation.

The writer's school focused on the teaching of school-wide thematic units. As the school year progressed, the writer discussed possible guest speakers and/or field trips that would be appropriate during each unit and encouraged the incorporation of as many of these as possible to help facilitate student learning in science through relevance to their daily lives and local issues.

During each grading period, the school district requires that the students be given a midpoint progress report at 4 1/2 weeks. Prior to each midpoint progress report being issued, the writer and teachers discussed any concerns they had about individual student progress. Ideas to better serve individual students based on prior experience with the student or ideas generated in any other manner were presented and discussed as well. Also, mid-term parent conferences were discussed in this same manner before and after the actual

conferences were held. Teachers were also asked to share what part portfolios played in these conferences and how the parents responded to the use of portfolios.

During each science department meeting, the writer and teachers discussed the hands-on activities that had been incorporated in their classes. They discussed ways to modify these activities if necessary and/or ways to have them run more smoothly in class. The teachers also shared how the students responded to each activity: if they enjoyed or disliked them or if they felt the were too babyish or too hard. The writer kept a listing of all activities and any modifications made for distribution to the teachers for future use.

During the final weeks of the practicum, the writer developed a student survey concerning the use of hands-on activities and portfolio assessment (see Appendix C). The survey was designed to determine if the students believed the incorporation of multiple hands-on activities and the use of portfolios helped to improve their grade in science, were enjoyed and beneficial, had no effect on their grade in science, or were a bother and served no purpose. The survey was distributed and completed by all students during the last week of school. The survey was designed to assist the writer in determining the students' responses to the strategies presented during the practicum and if the students believed that these strategies were to their academic benefit.

During teacher workdays following the close of the student school year, the writer and teachers discussed the

effectiveness of the practicum with respect to the number of students meeting the school district's standards for passing an academic subject. The writer and teachers also discussed what they, as classroom teachers, had learned from the experience and what parts of the process they foresaw themselves implementing in the future.

Chapter V: Results

Results

The problem to be solved in this practicum was the unacceptably high number of middle school students at the writer's school who were failing to pass science.

The writer implemented the following solutions to the problem: a) inservice workshops were set up to better prepare the classroom teacher in the use of hands-on techniques and activities and relate these specifically to living in Florida; b) a portfolio assessment workshop was conducted that assisted the teachers in establishing criteria for grading and placing work in portfolios and provide the teachers with reference material to assist them with portfolio assessment; c) the materials necessary to register for Multiple Intelligence classes were provided and the teachers were encouraged to register; d) letters of recommendation for the Multiple Intelligences classes were written. Through these strategies, the writer hoped to meet the goal of increasing the number of students passing middle school science within the work setting.

The outcome of increasing the number of students passing middle school science was met. The writer found that through the implementation of the above mentioned strategies more students passed middle school science than had been projected based on past school records (164 students out of the 180 enrolled passed science).

The number of students passing middle school science at

The number of students passing middle school science at the writer's school was higher than projected. The writer based this conclusion on the actual end of the year average in science as reported on individual student report cards. Of the 180 hundred students enrolled at the school, 161 of them earned a passing grade in science based on the criteria set by the school district (see Figure 1).

Discussion

The writer discussed the results with her co-workers who had participated in the practicum (personal communication, May 22, 1998) and they agreed that the inclusion of more hands-on activities and techniques as well as the use of portfolio assessment had had great influence on the students work. The teachers stated that after the workshops and/or inservices on Project Wild and EcoVentures:Learning in Florida's Environment, they were more comfortable doing hands-on work and demonstrating various techniques in the classroom. Prior to these workshops and/or inservices, they stated that they were somewhat intimidated to include these practices in their schedules. However, by the end of the school year they were very comfortable and recommended the inclusion of more such activities in all curriculums and believed that tying the curriculum to daily life and presenting it in a manner that was relevant and practical in daily life to the students was very beneficial. This concurs with the findings of Miller (1996) and Accongio and Doran (1993) that lessons based on everyday life situations are a

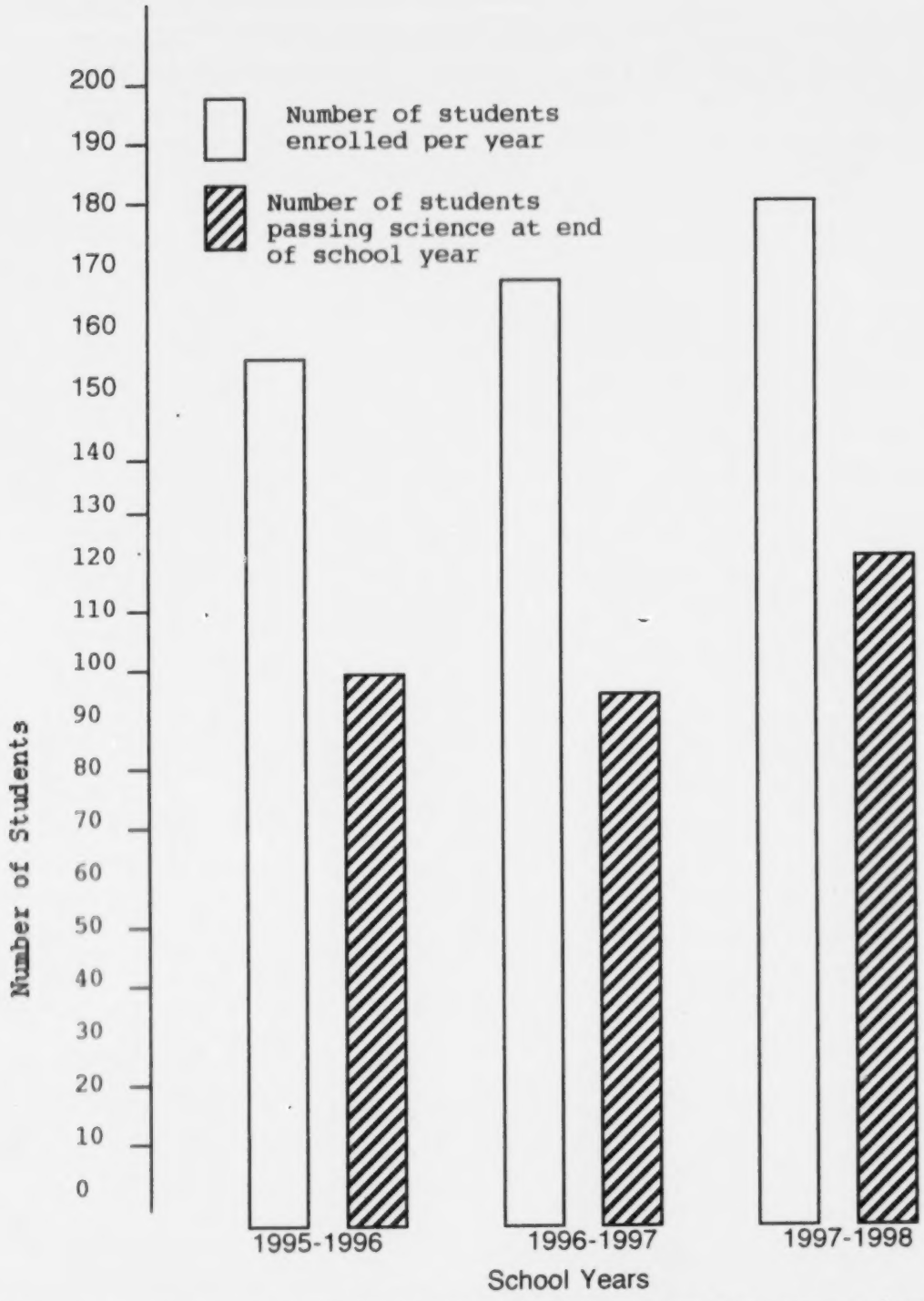

Figure 1. Number of students enrolled per year and the number of students passing science per year at the target school.

more efficient way to teach the standards and results in greater retention and understanding of the material. Both of the above mentioned programs demonstrated to the classroom teacher how to tie the activities to daily life and in the case of EcoVentures: Learning in Florida's Environment, specifically to the areas in which the students live. The findings of Johnson (1991), Bluhm (1995), and Prescott, Rinard, Cockerill, and Baker (1996) all concur that the material being taught must be pertinent to the student's daily lives and specifically endemic to the student's environment before they will buy ownership into it and thus be motivated to succeed. Further more, both programs are user friendly, easy to follow, coordinated for cross-curriculum inclusion, and the materials for the activities are generally inexpensive and easy to obtain. The teachers further stated that they had began to include many of the activities from these two programs in their other non-science classes that they teach.

Through the inclusion of the techniques and materials presented in the Multiple Intelligences classes, the teachers stated that they now better understand how various students learn and are now capable of identifying the various modalities used by students to learn. Through the understanding of these various learning modalities, teaching practices can be adjusted to reach more of the students. Gardner and Boix-Mansilla (1994) stressed that all children learn differently and that until we as teachers accept this and teach to the students' modality of learning, educational

success will be slow and the students unmotivated.

The teachers expressed that the inclusion of the portfolios at the mid-term parent conference had been a success. The presentation of all the students' actual work in the portfolios, both good work and not so good, had allowed the parents to see how their child had improved over time. The portfolios were the means by which students organized all of their graded materials throughout each nine weeks. The portfolios themselves were also a percentage of their nine weeks grade. Through the materials presented, the parents could see how their child had improved and how the semester had built on previous knowledge and how this knowledge was tied to the community and daily life. The portfolios allowed the graded materials that had been studied throughout the semester to be presented in such a manner that the students were very proud of their work and were not intimidated by the mid-term progress conference. The inclusion of the portfolios allowed even the shyest and/or the less academic student to feel comfortable and confident in their work and progress. The inclusion also high-lighted the students weak areas and/or areas of concern where the teacher felt that improvement was needed.

DeFina (1992), Yancey (1992), and Hibbard (1995) all agree that portfolios are a means of showing the students' efforts, progress, and achievements over a period of time. Through the implementation of portfolio assessment the student can and most often will demonstrate the development of planning skills, group process skills, self-evaluation,

and correction skills. At the same time, portfolios reflect the effectiveness of the program and teacher by illuminating the student in a positive manner.

The writer would like to note that the inclusion of portfolios themselves as a percent of the students' nine weeks grade had resulted in three students passing science who would have otherwise not met the school district's criteria and thus, failed to pass middle school science. These three students were not counted in the results of the practicum based on the fact that teachers had not used portfolio assessment as an actual grade to meet the school district's requirements for passing in previous years.

In conclusion, teachers must be aware that achievement is relevant and attainable only if students are motivated and perceive themselves as being responsible for their own learning. Therefore, it is the responsibility of the teacher to empower the students in the classroom, give them ownership in the curriculum and assessment process, and provide high quality intellectual learning climates that foster the development of learning and life skills.

Recommendations

The writer recommends that the various learning modalities of the students be reached through the inclusion of:

1. Mandated teacher attendance at Multiple Intelligence Classes and the application of the material in the individual classroom when ever possible. This will insure that more

students are given the opportune to understand and apply the information being presented.

2. The use of hands-on activities in the classroom at least twice per week. Again, this will insure that various learning techniques and styles are being met and hopefully make the class more interesting and pertinent to daily life for the students.

3. The use of portfolio assessment in some manner be implemented in all academic classes and that these be used at parent conferences. This will allow the parent to better understand exactly what the student has or has not been doing in class and give the student ownership in the conference.

The writer believes that a curriculum designed with the student in mind that fosters learning through various means and instills pride and responsibility will allow our future generations to lead us in the 21st century with universal success.

Dissemination

The writer has been approved to conduct a workshop during preplanning in the fall of 1998 on teaching integrated science through the use of hands-on activities and techniques. Later in the school year the workshop will be presented to other schools within the district. The writer also plans to continue teaching Project Wild workshops and promote EcoVentures: Learning in Florida's Environment.

References

Accongio, J.L. & Doran, R.L. (1993). Classroom assessment: Key to reform in secondary science education (Report No. MF01/PC09). Columbus, OH: Clearinghouse for Science, Mathematics, and Environmental Education. (ERIC Document Reproduction Service No. ED 370774).

Bluhm, W.J. (1995). Science methods for elementary and middle school teachers(1st ed.). Champaign, IL: Stipes Publishing.

Connecticut State Department of Education. (1991). Science, a guide to curriculum development Hartford, CT: Author.

Craig, M.T. & Yore, L.D. (1992). Middle school students' metacognitive knowledge about science reading and science text: An interview study (Report No. MF01/PC02). (ERIC Document Reproduction Service No. ED 356135).

Criscuola, M.M. (1994). Read, discuss, reread: Insights from the junior great books program. Educational Leadership, 51 (5), 58-61.

Cronin-Jones, L. (1992). The schoolyard wildlife activity guide. Gainesville, FL: Florida Game and Fresh Water Fish Commission.

DeFina, A.A. (1992). Portfolio assessment: Getting started. New York: Scholastic Professional Books.

EcoVentures:Learning in Florida's Environment. 4.0 [Computer Software]. (1995). Tallahassee,FL: Florida State University.

Ellsworth, P.C. & Sindt, V.G. (1994). Helping "aha" to happen: The contributions of Irving Sigel. Educational Leadership, 51 (5), 40-44.

Fielding, L.G. & Pearson, P.D. (1994). Reading comprehension:What works. Educational Leadership, 51 (5), 62-68.

Finson, K.D. (1994). Science alternative assessment models in Illinois. Journal of Science Teacher Education, 5 93), 97-110.

Gardner, H. & Boix-Mansilla, V. (1994). Teaching for understanding: Within and across the disciplines. Educational Leadership, 51 (5), 14-18.

Heckman, P.E., Confer, C.B., & Hakim. D.C. (1994) Planting seeds: Understanding through investigation. Educational Leadership, 51 (5), 36-39.

Helgson, S.L. (1992). Problem solving research in middle/junior high school science education (Report NO. SE053-010). Kansas City, MO: Kansas City Public School District. (ERIC Document Reproduction Service No. ED 350157).

Herman, J.L., Aschbacher,P.R., & Winters, L. (1992). A practical guide to alternative assessment. Alexandria, VA: Association for Supervision and Curriculum Development.

Hibbard, K.M. (1995). Performance assessment: In middle school science. New York: Glencoe.

Johnson, R.W. (1991). Using writing to learn with films. Science Scope, 5 (2), 27-29.

Jones, D.A. (1996). Twin tandem science initiative: A celebration of diversity. Dwight D. Eisenhower Math and Science Education Program.

Koba, S.B. (1996). Narrowing the achievement gap in science. Educational Leadership, 53 (5), 14-17.

Lake County School Board. (1997). Lake county teacher's handbook. Tavares,FL: Author.

Looman-DeWijk, S. (1996). Career and technology studies: Crossing the curriculum. Educational Leadership, 53 (8), 23-26.

Miller, R.A. (1996). What's up in factories?. Educational Leadership, 53 (5), 30-32.

National Center for Improving Science Education. (1992). Building scientific literacy: A blueprint for science in the middle years. Washington, DC: Author.

Nelson, J.R. & Frederick, L. (1994). Can children design curriculum?. Educational Leadership, 51 (5), 71-74.

Perkins, D. & Blythe, T. (1994). Putting understanding up front. Educational Leadership, 51 (5), 4-7.

Perrone, V. (Ed.) (1991). Expanding student assessment. Alexandria, VA: Association for Supervision and Curriculum Development.

Perrone, V. (1994) How to engage students in learning. Educational Leadership, 51 (5), 11-13.

Prescott, C., Rinard, B., Cockerill, J. & Baker, N. (1996). Science through workplace lenses.Educational_ Leadership, 53 (8), 10-13.

Project wild: K-12 activity guide. (4th printing).

(1995). Bethesda, MD: Western Regional Environmental Education Council, Inc.

Rappoport, A.L. & Kletzin. (1996). Kids around town: Civics lessons leave impressions. Educational Leadership, 53 (8), 26-29.

Sivertsen, M.L. (1993). Transforming ideas for teaching and learning science: a guide for elementary science education (Stock No. 065-000-00599-9). Washington, DC: U.S. Government Printing Office.

Unger, C. (1994). What teaching for understanding looks like. Educational Leadership, 51 (5), 8-10.

Welch, D.A. (1995). Improving student performance through alternative assessment. Teaching and Change,2 (4), 369-391.

Wilson, E.A. (1995). Reading at the middle and high school levels: Building active readers across the curriculum. Arlington, VA: Educational Research Service.

Wiske, M.S. (1994). How teaching for understanding changes the rules in the classroom. Educational Leadership, 51 (5), 19-21.

Woods, R.K. (1994). A close-up look at how children learn science. Educational Leadership, 51 (5), 33-35.

Yancey, K.B. (1992). Portfolios in the writing classroom. Urbana, IL: National Council of Teachers of English.

Appendix A

Grade Report

Grade Report

2nd period
Life Science

										POINTS EARNED	
ASSIGNMENT NUMBER:	1	2	3	4	5	6	7	8	9	CALCULATED FOR ASSIGNMENTS 1-9	
ASSIGNMENT CATEGORY:	V	CW	L	P	L	HW	V	PC	CT		
ASSIGNMENT VALUE:	100	100	100	100	100	100	100	100	100	N/A=100.0=A	
1. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	1.
2. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	2.
3. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	3.
4. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	4.
5. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	5.
6. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	6.
7. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	7.
8. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	8.
9. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	9.
10. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	10.
11. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	11.
12. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	12.
13. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	13.
14. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	14.
15. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	15.
16. student	EX	EX	EX	EX	EX	EX	EX	EX	EX	N/A	16.
AVERAGE SCORES:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
AVERAGE PERCENTS:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CLASS MEAN: N/A	

ASSIGNMENTS

1. Chapter 15 vocabulary
2. Ch.16 worksheet- "Fish Labeling"
3. Ch. 16: Lab 1- "Fish External Anatomy"
4. Participation- class notes- Fish Anatomy
5. Ch. 16: Lab 2- "Fish Dissection"
6. Ch. 16 homework: "Fish Report"
7. Chapter 16 vocabulary quiz
8. Ch. 16 Portfolio Check
9. Chapter 16 Test
10. _____

CATEGORIES

1. CT:	CHAPTER TESTS	= 20.0%
2. V:	VOCABULARY	= 10.0%
3. PC:	PORTFOLIO CHECK	= 20.0%
4. P:	PARTICIPATION	= 10.0%
5. L:	LABS	= 20.0%
6. HW:	HOMEWORK	= 5.0%
7. CW:	CLASSWORK	= 15.0%
8. ___:	_____	= _____%
9. ___:	_____	= _____%
10. ___:	_____	= _____%

BEST COPY AVAILABLE

Appendix B

Report Card

Report Card

SCHOOL BOARD OF

DATE _____ SCHOOL NUMBER _____ SCHOOL NAME _____ HOME ROOM _____ GRADE _____

STUDENT NUMBER _____ STUDENT NAME _____ SEX _____ INSTRUCTOR'S NAME _____

COURSE NAME	PER	1ST 9 WEEKS GRADE	C	ABS/E	ABS/U	2ND 9 WEEKS GRADE	C	ABS/E	ABS/U	SEM. EXAM GRADE	SEM. AVG.	3RD 9 WEEKS GRADE	C	ABS/E	ABS/U	4TH 9 WEEKS GRADE	C	ABS/E	ABS/U	SEM. EXAM GRADE	SEM. AVG.	FINAL AVG.	CREDIT
M/J MATH 2	01																						
M/J EXP WHEEL 4	02																						
M/J EXP WHEEL 3	02																						
M/J LIFE SCI	04																						
M/J LANG ARTS 2	05																						
M/J THROW/CATCH	06																						
M/J CAREER EDUCATION	06																						
M/J STRIKING/BODY	06																						
M/J GEOG:EUR AND AM	07																						
M/J EXP WHEEL 1	08																						
M/J EXP WHEEL 2	08																						

GRADING SYSTEM

A 94-100 OUTSTANDING PROGRESS
B 85-93 ABOVE AVERAGE PROGRESS
C 77-84 AVERAGE PROGRESS
D 70-76 LOWEST ACCEPTABLE PROGRESS
F 0-69 FAILURE
I INCOMPLETE

CONDUCT CODES

E - EXCELLENT
S - SATISFACTORY
N - NEEDS IMPROVEMENT
U - UNSATISFACTORY

RETAINED
PLACED
PROMOTED X

BEST COPY AVAILABLE

Appendix C

Student Survey

Student Survey

Students: Please answer the following questions by placing an X in the box that best describes how you feel.

	Strongly Agree	Agree	No Feelings	Strongly Disagree	Disagree
1. I enjoyed doing doing science labs.	☐	☐	☐	☐	☐
2. I learned from my experiences in the labs.	☐	☐	☐	☐	☐
3. I would like to do more science labs.	☐	☐	☐	☐	☐
4. I would like to do labs in other classes.	☐	☐	☐	☐	☐
5. I liked doing portfolios.	☐	☐	☐	☐	☐
6. I learned more science by keeping a portfolio.	☐	☐	☐	☐	☐
7. I liked using portfolios during parent conferences.	☐	☐	☐	☐	☐
8. I would like to use portfolios in other classes.	☐	☐	☐	☐	☐